be called good agreement with each other, considering the small dispersion and the fact that both lines lie outside the region of good focus.

4. Unfortunately, this spectrogram is too weak to justify any statement relative to the reality of a phenomenon similar to the Stark Effect, which Slipher evidently connects with the above apparently double lines.

R. F. SANFORD.

TWO NEW NOVAE IN THE ANDROMEDA NEBULA

Three half-hour exposures, made with the 60-inch reflector, one on January 4 and two on January 5, 1919, reveal two additional novae. These are numbered 12 and 13, numbers 10 and 11 having been reported in the December (1918) number of these PUBLICATIONS. Rough positions with reference to the nucleus and the approximate magnitudes are as follows for the second plate of January 5th.

No.	Co-ordinates		Magnitude
12	235″ N	85″ W	17.0
13	275″ S	220″ W	17.4

The exposure of January 4th was made under extremely bad seeing conditions and the plate cannot be used to determine variation of magnitude. It merely serves as an additional check upon the reality of the images. The first plate of January 5th is of poor quality, but number 12 certainly appears to be no brighter on it and may even be slightly fainter than on the following plate. Number 13 shows no change on the plates of January 5th. Number 12 is located in the patchy area which is so pronounced to the northwest of the nucleus. Number 13 is surrounded by the soft milky nebulosity along the major axis to the southwest of the nucleus.

Two similarly exposed plates were obtained on February 3, 1919. Number 12 is present on both plates and is estimated at about magnitude 17.3. Number 13 appears upon neither plate altho stars of the eighteenth magnitude are almost certainly present.

From the magnitude estimates made upon six novae in the Andromeda nebula, Nos. 2, 3, 4, 5, 6, and 10 (the others furnish no data), the rate of fall per day is found to average 0.05 of a magnitude. This is not at all inconsistent with the average rate for galactic novae. It will be seen that the change recorded for

number 12 amounts to only about 0.01 of a magnitude per day, from which it might be inferred that its maximum magnitude was reached after January 5th.

R. F. SANFORD.

ON THE RELATIVE INTENSITY OF THE ABSORPTION LINES IN A SPECTROSCOPIC BINARY

Let S and S' be two stars the visible areas of which are A and A'. Let us call i and i' the photometric intensity of the continuous spectrum in the region corresponding to vibrations of period $p_x + \Delta_x$ proceeding directly from S and S' unaffected by the absorbing element E, and let us call ie, $i'e'$ the intensity for vibrations of period p_x, after they have been absorbed by E.

When the light of both stars is received on the slit, the total intensity I for vibrations of period $p_x + \Delta_x$ will be

$$I = Ai + A'i',$$

while the total intensity I' for vibrations of period p_x, in the case that both stars are at rest with respect to the observer, will be

$$I' = Aie + A'i'e'.$$

Hence the relative intensity of the common absorption line, corresponding to vibrations of period p_x, as compared with the intensity of the continuous spectrum in the neighboring regions, corresponding to vibrations of period $p_x + \Delta_x$, will be given by

$$\frac{I'}{I} = \frac{Aie + A'i'e'}{Ai + A'i_1},$$

and putting

$$\frac{Ai}{A'i'} = R,$$

$$\frac{I'}{I} = \frac{Re + e'}{R + 1} \qquad (1)$$

What the ratio must be in order to show a definite absorption line is a matter of photographic technique, depending on many material factors; it seems, however, that $I'/I = 9/10$, or any smaller value, may suffice.

If the two stars are moving with respect to the observer, with relative velocities v and v', the vibrations absorbed will not arrive with the same period and therefore they will not occupy the same place in the spectrum; hence the necessity of dealing with them individually